

# SEARCH NOTES FOR EAST, IEEE, INSPEC, IP.COM, AND PROQUEST

SERIAL NUMBER

10589880

## EAST SEARCH

EAST: search history attached

Search terms:

(remote or remotely) same (calibrate or calibration or calibrating) same (phase or phased) same (antenna or array)

complex

carrier same signal

(inverse or inversely or invertible) same function

parasitic same phase

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(inverse or inversely or invertible) same function

parasitic same phase

1. (original) A method for remotely calibrating a phased array system (APA), comprising a number of transmit and/or receive modules (TRM), wherein the transmit gain (Sjmx) of each transmit and/or receive module can be set to one of a first collection of complex values (SnTx, dITx. SnTx ... dpTx- SnTx, dimX-djTx- SnTx ...), and/or the receive gain (Sje'x) of each transmit and/or receive module can be set to one of a second collection of complex values (SnRx, dIRx- SnP'x ... dpRx- SnRx, die'x-djRx" SnRx ...), said method comprising the steps of:
  - i) generating a first (FCS, CS) and a second carrier signal (SCS, CS);
  - ii) generating a first pulse train by modulating said first carrier signal (FCS, CS) and transmitting it using the phased array system (APA), wherein the transmit gain values of the transmit and/or receive modules (TRM) are set according to a pattern that changes during the transmission of said first pulse train; and/or receiving a second pulse train, generated by modulating said second carrier signal

(SCS, CS), using the phased array system (APA), wherein the receive gain values of the transmit and/or receive modules (TRM) are set according to a pattern that changes during the reception of said first pulse train;

iii)

demodulating said first pulse train using the second carrier signal (SCS, CS) and/or said second pulse train using the first carrier signal (FCS, CS), in order to determine a first ( $R_{sTG}(X)$ ,  $RT_x(X)$ ) and/or second ( $R_{GTs}(X)$ ,  $RR_x(X)$ ) series of complex amplitude values, wherein said first series of complex amplitude values is a first invertible function ( $C_{summx}(x)$ ) of said transmit gains of all the transmit and/or receive modules, affected by at least a first parasitic phase contribution ( $ei\sim(x)$ ,  $ei\sim'(x)$ ), and/or said second series of complex amplitude values is a second invertible function ( $C_{sumex}(x)$ ) of said receive gains of all the transmit and/or receive modules, affected by at least a second parasitic phase contribution ( $e\sim(x)$ ,  $ei\sim(x)$ );

iv) communicating said first and/or second series of complex amplitude values to a calibration elaboration unit (GS-EU, SAT-EU);

v)

removing said first ( $ei\sim(x)$ ,  $eia(x)$ ) and/or second ( $ei(P(x)$ ,  $eia(x)$ ) parasitic phase contributions from said first ( $R_{sTG}(X)$ ,  $RT_x(X)$ ) and/or second ( $R_{GTs}(X)$ ,  $Rex(X)$ ) series of complex amplitude values to obtain estimates of said first ( $C_{summx}(x)$ ) and/or second ( $C_{sumex}(x)$ ) invertible functions;

wherein step v) comprises the operations of:

a. determining first estimates of each individual complex value belonging to said first and/or second collection of complex values from a priori knowledge of the transmit and/or receive complex gain of each transmit and/or receive module (TRM);

b. computing first estimates of said first ( $C_{summx}(x)$ ) and/or second ( $C_{sumex}(x)$ ) invertible functions from said first estimates of each individual complex value belonging to said first and/or second collection of complex values;

c. computing estimates of said first ( $ei\sim(x)$ ,  $ei\sim'(x)$ ) and/or second ( $ei\sim(x)$ ,  $ei\sim'(x)$ ) parasitic phase contributions by removing said estimates of the first ( $C_{summx}(x)$ ) and/or second ( $C_{sumex}(x)$ ) invertible functions from said first ( $R_{sTG}(X)$ ,  $RT_x(X)$ ) and/or second ( $R_{GTs}(X)$ ,  $Rex(X)$ ) series of complex amplitude values;

d. modifying said estimates of the first ( $ei\sim(x)$ ,  $e\sim(x)$ ) and/or second ( $eko(x)$ ,  $ek'(x)$ ) parasitic phase contributions by adding a first ( $vTx$ ) and/or second ( $vex$ ) simulated phase noises, both having a pre-determined standard deviation ( $1/13$ ) and a non-uniform statistical distribution;

e. updating said estimates of said first ( $C_{summx}(x)$ ) and/or second ( $C_{sumex}(x)$ ) invertible functions by removing from said first ( $R_{sTG}(X)$ ,  $RT_x(X)$ ) and/or second ( $R_{GTs}(X)$ ,  $Rex(x)$ ) series of complex amplitude values the modified estimate of the parasitic phase contributions determined in operation d.

f. updating the estimates of the individual complex values belonging to said first ( $S_n^{Tx}$ ,  $dI^{Tx}$ -  $S_n^{Tx}$  ...  $dp^{Tx}$ -  $S_n^{Tx}$ ,  $dI^{Tx}$  $dJ^{Tx}$ -  $S_n^{Tx}$  ...) and/or second ( $S_n^{Rx}$ ,  $dI^{Rx}$ -  $S_n^{Rx}$  ...  $dp^{Rx}$ -  $S_n^{Rx}$ ,  $dI^{Rx}$  $dJ^{Rx}$ -  $S_n^{Rx}$  ...) collections by inverting said updated estimates of said first and/or second invertible functions;

and reiterating operations b. to f.

## IEEE SEARCH

Sun, 22 Jun 2008, 9:06:34 PM EST

Recent Search Queries

Results

#1 ((remote or remotely) and (calibrate or calibration or calibrating) and (phase or phased) and (antenna or array) and complex and carrier and signal)<in>metadata)

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## INSPEC SEARCH

Search history:

No.	Database	Search term	Info added since	Results	
CP		[Clipboard]		0	-
1	INZZ	(remote OR remotely) AND (calibrate OR calibration OR calibrating) AND (phase OR phased) AND (antenna OR array) AND complex AND carrier AND signal	unrestricted	0	

## IP.COM SEARCH

(remote or remotely) and (calibrate or calibration or calibrating) and (phase or phased) and (antenna or array) and complex and carrier and signal  
No relevant documents found.

## PROQUEST SEARCH

No documents found for: ((remote or remotely) and (calibrate or calibration or calibrating) and (phase or phased) and (antenna or array) and complex and carrier and signal)